

REMARKS

After the foregoing Amendment, claims 1 – 14 and 16 – 20 are pending in this application. Claims 1 and 3 are amended without prejudice. Applicant believes that the amendments are supported by the originally filed specification and no new matter has been introduced into the application by these amendments.

Claim Rejections - 35 USC §103

The Action rejects claims 1 – 14 and 16 – 20 as obvious over U.S. patent No. 3,574,591 (Lyons). The Action states that the previous amendment incorporating the term “consisting of” relates to the process steps; namely heating, neutralizing, pulverizing etc, rather than the reactants. Applicant respectfully disagrees and traverses the rejection for at least the following reasons.

Claim 1, as amended, recites:

A process for the preparation of water insoluble, bio-release iron-manganese polyphosphate fertilizer, the process consisting of

a) heating phosphoric acid at a temperature of at least 160°C with a mixture consisting essentially of (i) a source of iron oxide including one or more substance selected from the group consisting of goethite and hematite, (ii) pyrolusite and (iii) one or more basic compound selected from the group consisting of magnesium oxide(s), magnesium carbonate, calcium oxide, sodium oxide, potassium oxide, calcium carbonate, sodium carbonate, and potassium carbonate for a time period ranging from 20 minutes to 2 hours to produce a liquid polyphosphate;

b) neutralizing the liquid polyphosphate at a pH of 5 to 7.5, wherein the neutralized liquid is characterized by solubility in 0.33M citric acid and 0.005M DTPA;

c) drying the neutralized liquid polyphosphate to obtain a solid; and

d) pulverizing the solid.

Underline emphasis added.

The phrase “consisting essentially of” shows that there is no ammoniating or condensing agent, and distinguishes the invention of claim 1 from the process in Lyons et al., which includes an ammoniating or condensing agent.

The interplay of the lower time required for optimum polymerization followed by the step of neutralization, as recited in claim 1, provides a solid form that is soluble in citric acid and DTPA. Comparative data is provided in the enclosed Declaration. The example includes a time of heating and temperature that are varied so as to achieve forms of slightly viscous liquid with unreacted sediments to highly viscous liquid before neutralization. On neutralization all of the resultant forms include solid. However none of these are soluble in citric acid and DTPA except one. That one form was produced by the process of claim 1 and achieved optimum neutralization with optimum heating of 45 minutes in order to achieve solubility in 0.33 M citric acid and 0.005 M DTPA while the other residing beyond the scope of claim 1 did not provide the desire result. This shows the degree of polymerization as described in page 7 last paragraph of the PCT publication

corresponding to the above-identified application. In addition, when the appropriately polymerized product is neutralized at pH 5 to 7.5, as recited in step b, a better bio-release fertilizer is provided as is evident from example 2 in the specification.

The process described in Lyons is stopped midway and is unlikely to provide the results as described in the Declaration. As shown in the Declaration, only at specific temperatures will a soluble clear solution form when the viscous liquid is treated with citric acid. The interplay of time, temperature and neutralization is not taught in Lyons.

In Lyons, potassium is added after the reaction of combined ammoniating agent and condensing agent when short low temperatures and times are used:

It should be noted, however, that it may be advantageous at times to heat treat the reaction product of the combined ammoniating and condensing agent short of substantially complete conversion to ammonium polyphosphates and then add the potassium. When this is done, the initial heat treating temperatures are generally at relatively low temperatures for a relatively short heat treating time period.

Lyons, column 4, lines 57 – 64, underline emphasis added. In contrast, claim 1, as amended recites:

heating phosphoric acid at a temperature of at least 160°C with a mixture consisting essentially of (i) a source of iron oxide including one or more substance selected from the group consisting of goethite and hematite, (ii) pyrolusite and (iii) one or more basic compound selected from the group consisting of magnesium oxide(s), magnesium carbonate, calcium oxide, sodium oxide, potassium oxide, calcium

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carbonate, sodium carbonate, and potassium carbonate for a time period ranging from 20 minutes to 2 hours to produce a liquid polyphosphate... .

Underline emphasis added. If potassium is added as recited in claim 1, it is not added after heating for the desired time, as required by Lyons.

Claim 1 recites fewer components than required by Lyons. At the same time, the process recited in claim 1 provides water insoluble iron-manganese polyphosphate bio-release fertilizer, which has been shown to produce increased yield with the bio-release fertilizer, as demonstrated in example 2.

Based on the foregoing, Applicant believes that claims 1 – 14 and 16 – 20, as amended, are non-obvious over Lyons and that the rejection is overcome. Applicant requests withdrawal of the 35 U.S.C. § 103(a) rejection of claims 1 – 14 and 16 – 20.

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Conclusion

If the Examiner believes that any additional matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicant respectfully submits that the present application, including claims 1 – 14 and 16 – 20, is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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